Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of:

Amendment of the Commission's Part 90 Rules to increase co-channel separation between systems on 800/900 MHz Business and General Category frequencies and to liberalize licensing rules for SMR and Business systems	)))))))	RM-8028, RM-8029, RM-8030

COMMENTS OF THE SOUTHERN CALIFORNIA GAS COMPANY

To: The Commission

1. These Comments concerning the instant Petitions are filed by the Southern California Gas Company ("SCG"). SCG is a transporter and supplier of natural gas and related products and services to approximately 4.5 million consumers located within the southern one-half of the state of California. SCG is a licensee of the Commission in the Power Radio, Industrial/Land Transportation ("I/LT") and Business Radio Services (47 Code of Federal Regulations Part 90). SCG therefore has a direct and continuing interest in these proceedings.

2. Within its service territory, SCG operates mobile dispatch radio systems on the 150, 450, 510, 800, and 900 MHz frequency bands. Because of a number of concurrent factors, the southern California geographical region is arguably one of the most difficult area of the United States in which to operate Part 90 stations. These factors include a very high population density, an

exceptionally high degree of utilization of land mobile radio across all the Mobile services, very high elevation mountain top base station locations which provide greatly expanded mobile service ranges, very high aggregate radio frequency power levels enveloping communications sites, and unusual radio propagation conditions (tropospheric ducting) which often produce greatly enhanced service areas. SCG, with nearly 40 years of land mobile communications systems operating experience, well understands these factors.

3. RM-8028 speaks to increasing co-channel protection between 800/900 MHz systems on Business and General Category frequencies, by adopting a 40/22 dBu overlap criterion to replace the present 40/30 dBu contour requirement, including its concurrent "approximately 70 mile" separation specification (#90.621(c)). SCG applauds this proposed change; it is the correct response to the sorts of difficult coordination problems which are to be found in Southern California. The rugged topography found in this region facilitates the (relatively easy) production of <u>calculated</u> engineering analyses for co-channel coordination which <u>ostensibly</u> demonstrate successful compliance with a 40/30 dBu requirement by proposed stations which are considerably closer than 70 miles to existing ones. The realities of such close-spaced operation may be considerably different from the calculated results.

4. The current and proposed overlap criteria require some examination. At 800/900 MHz, assuming a 1/4 wave vertical dipole

receiving antenna and a receiver with 50 ohms input impedance, the following (approximate) relationships occur:

Field strength, dBu	Signal strength at receiver terminals, microvolts
40	4.3
30	1.3
22	0.5

For analog voice transmissions (20K0F3E and 13K6F3E), a 4.3 microvolt signal at the receiver input terminals yields very acceptable demodulated audio output at the speaker, considerably in excess of 30 dB of noise quieting and/or 24 dB of SINAD. Given the amount of limiting available in a receiver's intermediate frequency amplification chain, a 1.3 microvolt signal is also little different from a 4.3 microvolt signal in these characteristics. Thus a "40/30 dBu" overlap criterion results, in practical terms, in a competition for the receiver between two "strong signals," with only the well-known "capture effect" of the FM receiver to effect a resolution.

5. Moreover, the intersection of the 40 and 30 dBu curves, respectively, from two co-channel base stations at various geographical points is not a clean geometric line. Depending upon terrain and topography, at a specific location one transmitter will, instantaneously, dominate, while only a short distance away the other will have superior signal strength. The apparent result, to the mobile operator, will be a random intermixture of wanted and unwanted co-channel signals, leading to a considerable diminishment of the value of mobile communications. The situation becomes yet

more critical with trunked radio systems, which are especially intolerant of "non-system" co-channel base station transmissions.

6. The situation is analogous for data transmissions (20K0F2D and 13K6F2D emissions). Here mobile data communications systems, especially those which employ various forward error correction schemes, will operate quite satisfactorily at the 1.3 microvolt received signal level. Similar destructive interference will result between co-channel data transmission systems operating under the "40/30 dBu scenario."

7. In contrast, at 0.5 microvolts of received signal level analog voice transmission systems produce marginally acceptable demodulated audio, while data transmission systems are generally ineffective. Clearly, specifying a 40/22 dBu overlap requirement provides almost 20 dB (or a factor of 10 in absolute voltage) difference in received signal level at the terminals of a mobile receiver operating at the boundary of the two operating ranges. This level of difference is one which receivers can accommodate; the 40 dBu signal will cleanly "capture" the receiver from the 22 dBu signal, and interference-free communications, either analog voice or data, will result. In practical terms (as well as in theoretical construct), this sort of overlap protection will help considerably to minimize co-channel interference in southern California, and, we presume, all other locations as well. It is the correct specification for the purpose, and SCG most enthusiastically urges its adoption.

8. The above having been developed, it remains only for SCG to recommend, with equivalent vigor, that the 40/22 dBu overlap criterion be adopted for all 800/900 MHz coordinations, with specific reference to the I/LT spectrum which has heretofore not been included. The physics of electromagnetic radiation does not differentiate between various classes of human endeavors; there is no valid reason why FCC Rules should include such a differentiation.

9. As a subsidiary matter, SCG wishes to recommend that the Commission discontinue usage of the R-6602 curves as a means of calculating signal level contours. The instant curves have, in some memorable cases, led to spectacularly inaccurate estimations of 800/900 MHz propagation in southern California. SCG recommends adoption of Technote 101 procedures to replace the R-6602 curves, although we would not be adverse to the use of other, newer theoretical models which have been validated against actual transmission measurements within the southern California region.

10. RM-8029 seeks to liberalize the Commission's Rules for wide-area SMR and Business Radio trunked systems. SCG, as a coordinee in the Power Radio Service, already benefits from the special provisions of "wide area authority." Ordinarily we would favor the establishment of wide area systems in other categories as well, as a means of conserving frequencies; clearly, if two mobiles can operate on a co-channel basis with two "wide area licensed" base stations separated by more than 40 miles, a second frequency pair

would not be required. However, for the reason given infra, we cannot concur with this proposal.

11. A (possibly unintended) consequence of a grant of wide-area authority to an SMR or trunked Business system operator is the "liberation of excess potential loading." A practical example will demonstrate this. A particular SMR licensee proposes to establish 3 separate five-channel trunked wide area stations, each operating co-channel but separated from the other two by at least 40 miles. According to present Rules, each station would be considered primary, and each would require a loading of 500 units to be considered "fully loaded." Thus the system operator possesses an aggregate of stations which can accommodate a practical total of 1500 units, and which also requires loading of 500 units per station before additional channels would be granted. Under the proposed rules, the three stations will still service a total of 1500 units, but the aggregate will be considered "fully loaded" after the first 500 units are installed. With the "excess potential loading" of the next 1000 units, the system operator can request and receive an additional 10 channels, to add to his original five. Thus the overall consequence, of course, is zero net channel savings.

12. More importantly to SCG is the likelihood that requests for additional channels will be made through the intercategory sharing provisions of the Rules (#97.621). This is especially probable given the realities of channel utilization in major metropolitan areas: SMR and Business channels are rapidly licensed, while I/LT

channels are applied for, constructed, and utilized at a slower rate, and hence tend to remain "unused" for longer periods of time. The Commission must understand that eligibles for I/LT channels are major corporate entitles, who customarily construct and operate large private radio systems. These systems require multi-year funding and construction cycles. Nevertheless, usage of the I/LT channels by eligibles is every bit as critical as any communications activities conducted on SMR or Business frequencies. SCG, for example, would remind the Commission that it has responsibility for the transport and delivery of large quantities of explosive/inflammable material to a very large customer base. SCG's communications, at any time, can involve Safety of Life and Property. Clear, reliable, and more importantly, sufficient quantities of I/LT radio communications channels are an absolute pre-requisite for the safe conduct of its business. The I/LT channel pool cannot and should not be utilized as the "private reserve" of SMR and Business licensees, exactly the situation which would be (again, perhaps unintentionally) engendered by the instant Petition.

13. SCG therefore must oppose the provisions of RM-8029 on that basis. However, it could support the concept of "wide area licensing" provided that:

> 1. siteing of such stations conforms to the (co-channel) overlap requirements of RM-8028, and
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> 2. any excess potential loading so created <u>not</u> be accepted as justification for the issuance of additional channels either for the licensees present system or for any proposed new systems.

14. RM-8030, although perhaps somewhat confused in its construction, appears to foster many of the same goals as RM-8029. For the reasons cited supra, SCG also opposes RM-8030 as presently written.

SUMMARY

SCG applauds the attempt, through RM-8028, to establish in the Rules increased and realistic co-channel separation. We would proceed somewhat farther than the instant Petition, in that SCG urges the proposed overlap criterion, 40/22 dBu, to be adopted for all private land mobile stations operating at 800 and 900 MHz. SCG could endorse the concept of "wide area licenses" for SMR and Business radio systems, were it not for the (perhaps unintended) consequence of fostering additional intercategory sharing requests involving the I/LT channel pool. Unless this problem can be mediated, SCG cannot concur in RMs-8029 and -8030.

Respectfully submitted,
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